

# CHAPTER 8—ANIMAL RESEARCH FACILITIES

## HIGHLIGHTS

- Eighty-three percent of all research-performing institutions had laboratory animal facilities in 1998 (table 8-1).
- Institutions reported a total of 11.9 million net assignable square feet of animal research space. This represents 8 percent of all science and engineering research space. The percentage is similar across the three types of research-performing institutions (table 8-1).
- The distribution of animal research space parallels the distribution of S&E research space. Seventy-one percent of all S&E research space and 72 percent of all animal research space is located in the top 100 institutions; 24 percent of all S&E research space and 23 percent of all animal research space is located in other doctorate-granting institutions, and 5 percent of each type of space is located in nondoctorate-granting institutions (tables 8-1 and 1-1).
- Institutions with animal research space reported that 75 percent (8.9 million NASF) of that space was at the lowest Federal biosafety level, Level 1. Another 23 percent (2.7 million NASF) was at Level 2, while 3 percent (0.4 million NASF) was at Level 3. No research-performing academic institution had S&E research space at Level 4 (i.e., for work with biological agents that may cause the transmission of a potentially lethal disease for which there is no readily available cure) (table 8-3).
- Five percent of the institutions with animal research facilities are scheduled to start construction on a half million NASF of animal research space in 1998 and 1999. They are scheduled to commit \$162.1 million to these projects (tables 8-4 and 8-5).

laboratories in which animal research is conducted are examined in this chapter. Institutions estimated the amount of animal housing space and animal laboratory space to arrive at a total amount of animal research space. They were asked to include as laboratory animal facilities both departmental and central facilities that are subject to government and State policies and regulations concerning the humane care and use of laboratory animals. Not included were agricultural buildings that did not directly support research or that were not subject to government regulations, nor were areas for the veterinary treatment of animals. In addition, institutions provided estimates of the amount of animal research space scheduled for construction and repair/renovation in 1998 and 1999. Scheduled expenditures on these items were provided for construction and repair/renovation projects costing over \$100,000. (See Item 8 of the survey in Appendix C.)

The 1996 survey addressed biosafety issues by asking respondents to state the amount of net assignable square feet that:

- A fully meets government regulations.
- B needs limited repair/renovation to meet government regulations.
- C needs major repair/renovation or replacement to meet government regulations.

In the 1998 survey, the question was changed to capture directly the amount of space that met the Federal Government's recommended biosafety levels for Animal Biological Safety:<sup>30</sup>

- A **Level 1** practices, safety equipment, and facilities are appropriate for undergraduate and secondary educational training and teaching laboratories, and for other facilities in which work is done with defined and characterized strains of viable microorganisms not known to cause disease in healthy adult humans.

## INTRODUCTION

Scientists in the fields of biology, agriculture, psychology, and medicine often use animals in their research. Issues related to the housing of animals and the

---

<sup>30</sup> The descriptions of the levels were taken from *Biosafety in Microbiological and Biomedical Laboratories*, 3rd Edition, 1993. Washington, DC: U.S. Government Printing Office, 1993.

- B **Level 2** practices, equipment, and facilities are applicable to clinical, diagnostic, teaching and other facilities in which work is done with the broad spectrum of indigenous moderate-risk agents present in the community and associated with human disease of varying severity.
- C **Level 3** practices, safety equipment, and facilities are applicable to clinical, diagnostic, teaching, research, or production facilities in which work is done with indigenous or exotic agents with a potential for respiratory transmission, and which may cause serious and potentially lethal infection.
- D **Level 4** practices, safety equipment, and facilities are applicable for work with dangerous and exotic agents, which pose a high individual risk of life-threatening disease, which may be transmitted via the aerosol route, and for which there is no available vaccine or therapy.

As a result of the change in the biosafety questions, issues pertaining to biosafety in the 1996 survey and the 1998 survey cannot be compared.

## FINDINGS

### AMOUNT OF SPACE DEVOTED TO ANIMAL RESEARCH

In 1998, 546 of the 660 research-performing institutions (83 percent) had laboratory animal facilities. The doctorate-granting institutions were more likely than the nondoctorate-granting institutions to have such facilities (86 percent compared with 78 percent), with almost all of the top 100 institutions (97 percent) having them (table 8-1).

Institutions reported a total of 11.9 million net assignable square feet of animal research space. Most of that space (95 percent or 11.2 million NASF) was located in the doctorate-granting institutions. The distribution of animal research space paralleled the distribution of science and engineering research space (see table 1-1):

- The top 100 institutions accounted for 71 percent of all S&E research space (101 million NASF) and 72 percent of all animal research space (8.5 million NASF);

**Table 8-1. Amount and distribution of space for laboratory animal facilities by institution type: 1998**

Institution type	Institutions with laboratory animal facilities		Total animal research space		
	Number	Percentage of institutions	NASF [in millions]	Percentage of total animal research NASF	Percentage of total S&E research space*
Total.....	546	83	11.9	100	8.3
Doctorate-granting.....	325	86	11.2	95	8.2
Top 100 in research expenditures.....	97	97	8.5	72	8.4
Other.....	228	82	2.7	23	7.7
Nondoctorate-granting.....	221	78	0.6	5	8.6

\* These percents were derived by dividing animal research space by total S&E research space (table 1-1).

**KEY:** NASF = net assignable square feet.  
S&E = science and engineering.

**NOTE:** Components may not add to totals due to rounding.

**SOURCE:** National Science Foundation/Division of Science Resources Studies, 1998 Survey of Scientific and Engineering Research Facilities at Colleges and Universities.

- The other doctorate-granting institutions accounted for 24 percent of all S&E research space (35 million NASF) and 23 percent of all animal research space (2.7 million NASF); and
- The nondoctorate-granting institutions accounted for 5 percent of all S&E research space (7 million NASF) and 5 percent of all animal research space (0.6 million NASF).

These 11.9 million NASF of animal research space represent 8.3 percent of all S&E research space. This percentage is similar across the three types of research-performing institutions (range: 7.7 to 8.6 percent). Further, this proportion remained constant overall and at each type of institution between 1994–95<sup>31</sup> and 1996–97, indicating that animal research space is growing at the same rate as S&E research space.

Overall, almost three quarters (72 percent) of the total amount of animal research space (8.6 million NASF) was used to house laboratory animals, and slightly more than one quarter (28 percent or 3.3 million NASF) was designated as animal laboratory space. The amount of

animal housing space as a percent of total S&E research space was relatively constant at about 6 percent across institution types (range: 5.8 to 6.2 percent). Similarly, the amount of animal laboratory space as a percent of total S&E research space was also relatively constant at slightly more than 2 percent across institution types (range: 2.1 to 2.6 percent) (table 8-2).

## DISTRIBUTION OF ANIMAL RESEARCH SPACE AT COLLEGES AND UNIVERSITIES BY BIOSAFETY LEVEL

Institutions with animal research space reported that 75 percent (8.9 million NASF) of that space was at Federal biosafety Level 1 (i.e., acceptable for work with microorganisms not known to cause disease in healthy humans). Another 23 percent (2.7 million NASF) was at Level 2 (i.e., acceptable for work with moderate-risk agents present in the community and associated with human disease of varying severity), and 3 percent (0.4 million NASF) was at Level 3 (i.e., acceptable for work with indigenous or exotic agents with a potential for respiratory transmission, and which may cause serious and potentially lethal infection). No research-performing academic institution had S&E research space at Level 4 (i.e., acceptable for work with biological agents that may cause the transmission of a potentially lethal disease for which there is no readily available cure) (table 8-3).

<sup>31</sup> These data come from National Science Foundation/Division of Science Resources Studies, *Scientific and Engineering Research Facilities at Colleges and Universities: 1996*, NSF 96-326, table 9-1.

**Table 8-2. Amount and distribution of animal housing space and laboratory animal space by institution type: 1998**

Institution type	Animal housing space			Animal laboratory space		
	NASF [in millions]	Percentage of total animal research NASF	Percentage of total S&E research space <sup>1</sup>	NASF [in millions]	Percentage of total animal research NASF	Percentage of total S&E research space <sup>2</sup>
Total.....	8.6	72	6.0	3.3	28	2.3
Doctorate-granting.....	8.1	72	6.0	3.1	28	2.3
Top 100 in research expenditures.....	6.1	72	6.0	2.4	28	2.4
Other.....	2.0	75	5.8	0.7	27	2.1
Nondoctorate-granting.....	0.4	73	6.2	0.2	30	2.6

<sup>1</sup> These percentages were derived by dividing animal housing space by total S&E research space (table 1-1).

<sup>2</sup> These percentages were derived by dividing animal laboratory space by total S&E research space (table 1-1).

**KEY:** NASF = net assignable square feet.  
S&E = science and engineering.

**NOTE:** Components may not add to totals due to rounding.

**SOURCE:** National Science Foundation/Division of Science Resources Studies, 1998 Survey of Scientific and Engineering Research Facilities at Colleges and Universities.

**Table 8-3. Percentage of animal research space at each animal biological safety level by institution type: 1998**

Institution type	Animal biological safety level			
	Level 1 <sup>1</sup>	Level 2 <sup>2</sup>	Level 3 <sup>3</sup>	Level 4 <sup>4</sup>
Total.....	75	23	3	0
Doctorate-granting.....	74	24	3	0
Top 100 in research expenditures.....	72	25	3	0
Other.....	80	18	2	0
Nondoctorate-granting.....	93	7	0	0

<sup>1</sup> Acceptable for work with microorganisms not known to cause disease in healthy humans.

<sup>2</sup> Acceptable for work with moderate-risk agents present in the community and associated with human disease of varying severity.

<sup>3</sup> Acceptable for work with indigenous or exotic agents with a potential for respiratory transmission, and which may cause serious and potentially lethal infection.

<sup>4</sup> Acceptable for work with biological agents that may cause the transmission of a potentially lethal disease for which there is no readily available cure.

**NOTE:** Components may not add to totals due to rounding.

**SOURCE:** National Science Foundation/Division of Science Resources Studies, 1998 Survey of Scientific and Engineering Research Facilities at Colleges and Universities.

The doctorate-granting institutions had a greater amount of animal research space at the higher biosafety levels, Levels 2 and 3 (27 percent or 3 million NASF), than the nondoctorate-granting institutions (7 percent or 42,000 NASF). In fact, the nondoctorate-granting institutions had no animal research space at Level 3 and less than 10 percent at Level 2.

## AMOUNT OF ANIMAL RESEARCH SPACE SCHEDULED FOR CONSTRUCTION AND REPAIR/RENOVATION

The research-performing institutions are scheduled to start construction on 492 thousand NASF of animal research space in 1998 and 1999. This is 3 percent of all S&E construction scheduled to start in 1998 and 1999 (14.6 million NASF) (Appendix table E3-2) and is 24 percent or 153 thousand NASF less new animal research space than was scheduled to be constructed in 1996 and 1997<sup>32</sup> (645 thousand NASF) (table 8-4):

<sup>32</sup> These data come from National Science Foundation/Division of Science Resources Studies, *Scientific and Engineering Research Facilities at Colleges and Universities: 1996*, NSF 96-326, table 9-5.

**Table 8-4. Amount of laboratory animal space scheduled for construction and repair/renovation: 1998–99**

Institution type	Construction	Repair/renovation
NASF in thousands		
Total.....	492	303
Doctorate-granting.....	440	292
Top 100 in research expenditures.....	329	193
Other.....	112	99
Nondoctorate-granting....	52	12

**KEY:** NASF = net assignable square feet.

**NOTE:** Components may not add to totals due to rounding.

**SOURCE:** National Science Foundation/Division of Science Resources Studies, 1998 Survey of Scientific and Engineering Research Facilities at Colleges and Universities.

- The top 100 institutions account for 67 percent (329 thousand NASF) of the animal facilities construction scheduled to begin in 1998 and 1999;
- The other doctorate-granting institutions account for 23 percent (112 thousand NASF) of the animal facilities construction scheduled to begin in 1998 and 1999; and
- The nondoctorate-granting institutions account for 11 percent (52 thousand NASF) of the animal facilities construction scheduled to begin in 1998 and 1999.

The research-performing institutions are scheduled to begin repair/renovation projects that will affect 303 thousand NASF of animal research space in 1998 and 1999. This is less than 2 percent of all S&E repair/renovation projects scheduled to start in 1998 and 1999 (15.6 million NASF) (Appendix table E4-2) and is 43 percent or 229 thousand NASF less animal research space than was scheduled to be affected by new repair/renovation projects begun in 1996 and 1997<sup>33</sup> (532 thousand NASF):

- The top 100 institutions account for 64 percent (193 thousand NASF) of the animal facilities repair/renovation projects scheduled to begin in 1998 and 1999;

<sup>33</sup> Ibid.

- The other doctorate-granting institutions account for 32 percent (99 thousand NASF) of the animal facilities repair/renovation projects scheduled to begin in 1998 and 1999; and
- The nondoctorate-granting institutions account for 4 percent (12 thousand NASF) of the animal facilities repair/renovation projects scheduled to begin in 1998 and 1999.

These decreases in scheduled construction and scheduled repair/renovation of animal research space may be less a decline in facilities expansion and upgrading than a return to normal levels. It is possible that the 1996 survey captured the tail end of an unusual amount of activity among institutions as they strove to bring their animal research facilities into conformance with stricter animal welfare regulations that were established between 1989 and 1994 and which required institutions to upgrade their facilities. There has also been a movement to centralize animal research space such that animal research space is often shared by several departments instead of being dispersed throughout the institution.<sup>34</sup>

## FUNDS SCHEDULED FOR THE CONSTRUCTION AND REPAIR/RENOVATION OF ANIMAL RESEARCH SPACE

Overall, 35 of the research-performing institutions (5.3 percent of all research performing institutions) are scheduled to start construction on animal research facilities in 1998 and 1999, and 56 of the research-performing institutions (10.2 percent of those with animal research facilities) are scheduled to start repair/renovation projects. The distribution of these scheduled projects among institution types is as follows:

- Among the top 100 institutions, 21 institutions had scheduled construction projects and 34 institutions had scheduled repair/renovation projects;
- Among the other doctorate-granting institutions, 9 institutions had scheduled construction projects and 16 institutions had scheduled repair/renovation projects; and
- Among nondoctorate-granting institutions, 5 institutions had scheduled construction projects and 6 institutions had scheduled repair/renovation projects (table 8-5).

<sup>34</sup> This information was provided by Barbara Rick, Executive Director, National Association for Biomedical Research.

Although fewer institutions were scheduled to start animal research facilities construction projects in 1998 and 1999 than were scheduled to start repair/renovation projects, they were scheduled to commit more than three times as many funds to construction projects (\$162.1 million) as they were scheduled to commit to repair/renovation projects (\$45.1 million).

The amount of funds scheduled to be committed to the construction of new animal facilities in 1998 and 1999 (\$162.1 million) was not substantially different from the amount of funds that were scheduled to be committed to the construction of new animal facilities in 1996 and 1997 (\$164.1 million).<sup>35</sup> These funds represented 4 percent of total funds committed to all new S&E construction scheduled to begin in 1998 and 1999 (\$3,949 million) (see tables 3-4 and 8-5):

- The top 100 institutions accounted for 73 percent (\$119.1 million) of all funds scheduled to be committed to new animal facilities construction projects;
- The other doctorate-granting institutions accounted for 15 percent (\$24.3 million) of all funds scheduled to be committed to new animal facilities construction projects; and
- The nondoctorate-granting institutions accounted for 11 percent (\$18.6 million) of all funds scheduled to be committed to new animal facilities construction projects.

The amount of funds scheduled to be committed to new animal facilities repair/renovation projects in 1998 and 1999 (\$45.1 million) was considerably less (46 percent or \$38.2 million) than was scheduled to be committed to new animal facilities repair/renovation projects in 1996 and 1997 (\$83.3 million).<sup>36</sup> These funds represented 3 percent of the total funds committed to all new S&E repair/renovation projects scheduled to begin in 1998 and 1999 (\$1,580 million) (see table 4-4):

<sup>35</sup> These data come from National Science Foundation/ Division of Science Resources Studies, *Scientific and Engineering Research Facilities at Colleges and Universities: 1996*, NSF 96-326, table 9-4. These values have not been adjusted for inflation because they were scheduled for the 1996 and 1997 fiscal years.

<sup>36</sup> These data come from National Science Foundation/Division of Science Resources Studies, *Scientific and Engineering Research Facilities at Colleges and Universities: 1996*, NSF 96-326, table 9-4.

**Table 8-5. Number and percentage of institutions and the amount of funds scheduled for the construction and repair/renovation of laboratory animal facilities: 1998–99**

Institution type	Scheduled construction			Scheduled repair/renovation		
	Number of institutions	Percentage of institutions <sup>1</sup>	Cost [In millions of dollars]	Number of institutions	Percentage of institutions <sup>2</sup>	Cost [In millions of dollars]
Total.....	35	5.3	162.1	56	10.2	45.1
Doctorate-granting.....	30	8.1	143.4	50	15.3	43.2
Top 100 in research expenditures.....	21	21.0	119.1	34	35.1	34.9
Other.....	9	3.4	24.3	16	6.9	8.3
Nondoctorate-granting.....	5	1.7	18.6	6	2.7	1.9

<sup>1</sup> Percentages are based on all institutions (see table 1-1 for the number of institutions in each category).

<sup>2</sup> Percentages are based on those institutions with animal research space (see table 8-1 for the number of institutions in each category).

**NOTE:** Components may not add to totals due to rounding.

**SOURCE:** National Science Foundation/Division of Science Resources Studies, 1998 Survey of Scientific and Engineering Research Facilities at Colleges and Universities.

- The top 100 institutions accounted for 77 percent (\$34.9 million) of all funds scheduled to be committed to animal facilities repair/renovation projects;
- The other doctorate-granting institutions accounted for 18 percent (\$8.3 million) of all funds scheduled to be committed to animal facilities repair/renovation projects; and
- The nondoctorate-granting institutions accounted for 4 percent (\$1.9 million) of all funds scheduled to be committed to animal facilities repair/renovation projects.